

REMARKS

1. Preliminary Remarks

a. Status of the Claims

Claims 1-52 are pending in this application. Claims 1-52 are hereby canceled without prejudice to pursuing the canceled subject matter in a continuing application. Claims 53-66 are new. Applicant requests that the amendments and remarks made herein be entered into the file history of the application. Upon entry of the amendments, claims 53-66 will be pending and under active consideration.

b. Amendments to the Claims

Support for new claims 53-66 is found throughout the specification as originally filed, including at claims 1 and 24; page 10, lines 8-14; page 13, lines 6-23; and Examples 1-4.

c. Claim Objections

On page 2 of the Office Action, the Examiner objects to claims 11 and 27. These claims have been canceled, thereby rendering the objections moot.

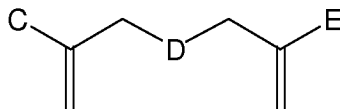
2. Patentability Remarks

a. 35 U.S.C. § 112, second paragraph

On pages 2-5 of the Office Action, the Examiner rejects claims 1, 3, 4, 6-8, 11, 13, 24, 25, 29, and 30 under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. All of these claims have been canceled, and none of the allegedly indefinite limitations is included in the new claims, thereby rendering the Examiner's rejection moot.

b. 35 U.S.C. § 102

On page 5-8 of the Office Action, the Examiner under 35 U.S.C. § 102(b) rejects claims 1-3, 8-11, 14, 15, and 24-27 as allegedly being anticipated by US 2003/0114546 ("Asai" hereafter), and claims 1, 5-15, 24-30 as allegedly being anticipated by US 7,235,297 ("Côté" hereafter). New claim 53 relates to a cross-linked polyether that is made by polymerizing only one type of monomer having the general structure:



where D is PEG, PPG, or poly(THF), and C and E are independently an electron withdrawing group, an electron releasing group, or a C₁-C₃₀ aryl. New claim 61 relates to a method of preparing a cross-linked polyether by polymerizing only one type of monomer with this structure.

(1) Asai

The Examiner asserts that Asai discloses a bifunctional cross-linkable monomer that has two polymerizable carbon-carbon double bonds that are linked together via a polyethylene glycol or polypropylene glycol, and specifically a polyethylene glycol di(meth)acrylate. Office Action at p. 6. The Examiner further asserts that these structures fall within the scope of claim 10. *Id.* The polymer disclosed by Asai, however, is made by polymerizing a polymerizable monomer and a cross-linkable monomer, thus requiring **two different types of monomers**. Asai at paragraph 0033.

In stark contrast, the instant claims relate to a cross-linkable polyether that is made using **only one type of monomer**. Asai does not teach or suggest a cross-linked polyether made using only one type of monomer. Instead, Asai stresses the importance of the proportion of cross-linkable monomer to polymerizable monomer in making a polymer with a desirable maximum expansion ratio. *Id.* at paragraph 0034. The combination of two different components is therefore critical to achieving the desired polymer of Asai, and the instantly claimed subject matter is thus readily distinguishable from the polymer taught by this reference. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of the claims under 35 U.S.C. § 102(b) in view of Asai.

(2) Côté

On page 7 of the Office Action, the Examiner asserts that Côté discloses a cross-linked polyether made by polymerizing methacrylic acid, and that because this compound is polymerizable with PEG, PPG, or poly(THF), methacrylic acid falls within the scope of part (b) of claims 1 and 24. Much like the polymer taught by Asai, the cross-linked polyether taught by Côté requires copolymerization of at least one polymerizable monomer with at least one cross-linker or divinyl benzene—thus requiring **at least two different components**. *See* Côté at column 4, lines 30-37. As discussed above, however, the instantly claimed subject matter relates to a cross-linked polyether made from **only one** type of monomer. Côté does not teach or suggest making a polymer using only one type of monomer. Accordingly, the instantly claimed subject matter is readily distinguishable from the polyether disclosed by Côté. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejections under 35 U.S.C. § 102(b) in view of Côté.

c. 35 U.S.C. § 103**(1) Claims 2-4**

On page 9 of the Office Action, the Examiner rejects claims 2-4 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Côté. The Examiner asserts that it would have been obvious to use styrene in making the polyether taught by Côté. Claims 2-4 have been canceled, and the instant claims do not relate to a cross-linked polyether containing polystyrene, thereby rendering the Examiner's rejection of these claims moot. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 2-4 under 35 U.S.C. § 103(a).

(2) Claims 29 and 30

On pages 9 and 10 of the Office Action, the Examiner rejects claims 29 and 30 as allegedly being unpatentable over Côté. The Examiner asserts that in view of this cited reference it would have been obvious to use a cross-linker having an acrylamide or methacrylamide end group to prepare a cross-linked polyether. As discussed above, however, the instantly claimed cross-linked polyether is made from only one type of monomer. Despite the instant polyether being based on only one type of monomer, the instantly claimed cross-linked polyether is more stable than standard polyethers taught in the prior art. *See* Instant Application at p. 44, lines 5-7.

The instantly claimed cross-linked polyether is therefore not obvious because it is based on only one type of monomer, yet achieves superior polymer stability compared to other polyethers taught in the prior art. *See* MPEP § 2144.04.II.B (“[O]mission of an element and retention of its function is an indicia of unobviousness”). On the other hand, Côté discloses that at least two different compounds should be used to make a cross-linked polyether—specifically, an acrylic, methacrylic, maleic and/or itaconic acid derivative monomer copolymerized with PEG (or PPG) secondary and/or tertiary cross-linkers having terminal end groups such as vinyl ketones, diallyl ethers, or divinyl ethers. *See* Côté at column 5, line 63–column 6, line 9. Côté further discloses that using these compounds results in a “most chemically stable polymer because of the nature of the primary ethers known to be used in more extreme conditions.” *Id.* at column 7, lines 34–40. Given that Côté discloses that it is desirable to make a more stable polyether by copolymerizing at least two different components, there would be no reason for one of skill based on Côté to make the instant cross-linked polyether made using only one type of monomer.

Additionally, the instantly claimed subject matter is not obvious because, as described below, a resin made from a cross-linked polyether of the instant claims has unexpectedly superior qualities compared to other polyethers. *See* MPEP § 2144.09.VII (“A *prima facie* case of obviousness based on

structural similarity is rebuttable by proof that the claimed compounds possess unexpectedly advantageous or superior properties”). As disclosed in Example 5 and Figure 1 of the instant application, a resin made from a polyether of the instant claims has far superior swelling properties compared to known commercial resins. In some solvents, the instant polyether-based resin exhibits at least twice the swelling as the next-closest commercial resin. *See, e.g.,* Instant Application at Figure 1 (TFA and water). As further disclosed in Examples 9 and 10, and Figures 2-5 of the instant application, a resin made from a polyether of the instant claims also shows far superior crude peptide purity as compared to commercial resins, when the resins are used in peptide synthesis. For example, while the instant polyether-based resin exhibits 92% purity of crude peptide, the commercial resins shown exhibit only 9-62% peptide purity. *See, e.g., Id.* at p. 43, Table 1. Thus, compared to commercial resins, the instant polyether-based resin requires only single couplings for peptide chemistry, in comparison to double or triple couplings that are required by commercial resins. *See Id.* at p. 43, lines 6-16. The teachings of Côté give no indication to one of ordinary skill in the art that using only one type of monomer to make a cross-linked polyether, as is instantly claimed, would have these superior qualities. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejections under 35 U.S.C. § 103(a).

3. Conclusion

Applicant respectfully submits that the instant application is in good and proper order for allowance and early notification to this effect is solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the instant application, the Examiner is encouraged to call the undersigned at the number listed below.

Respectfully submitted,
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